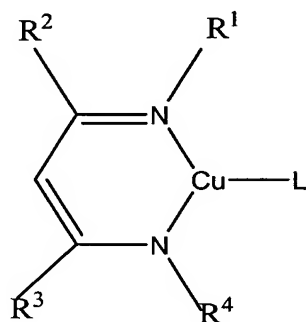


CLAIMS

What is claimed is:

1. A process for forming copper deposits on a substrate
- 5 comprising:
- a. contacting a substrate with a copper complex, (I), to form a deposit of a copper complex on the substrate; and



(I)

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- b. contacting the deposited copper complex with a reducing agent, wherein

L is an olefin comprising 2 – 15 carbons;

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$R^1$  and  $R^4$  are independently selected from the group consisting of hydrogen, methyl, ethyl, propyl, isopropyl, isobutyl, and neopentyl;

$R^2$  and  $R^3$  are independently selected from the group consisting of phenyl and  $C_1$ - $C_{10}$  alkyl groups; and

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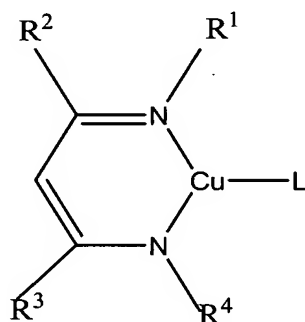
the reducing agent is selected from the group consisting of 9-BBN; diborane; boranes of the form  $BR_xH_{3-x}$ , where  $x = 0, 1$  or  $2$ , and  $R$  is independently selected from the group consisting of phenyl and  $C_1$ - $C_{10}$  alkyl groups; dihydrobenzofuran; pyrazoline; disilane; silanes of the form  $SiR'_yH_{4-y}$ , where  $y = 0, 1, 2$  or  $3$ , and  $R'$  is independently selected from the group consisting of phenyl and  $C_1$ - $C_{10}$  alkyl groups; and germanes of the form  $GeR''_zH_{4-z}$ , where  $z = 0, 1, 2$ , or  $3$ , and  $R''$  is independently

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selected from the group consisting of phenyl and C<sub>1</sub>-C<sub>10</sub> alkyl groups.

2. The process of Claim 1, wherein R<sup>2</sup> and R<sup>3</sup> are methyl and R<sup>1</sup> and R<sup>4</sup> are isobutyl.
3. The process of Claim 1, wherein L is vinyltrimethylsilane.
4. The process of Claim 1, wherein the substrate is selected from the group consisting of copper, silicon wafers and silicon dioxide coated with a barrier layer.
5. The process of Claim 1, wherein the substrate is exposed to a vapor of the copper complex.
6. The process of Claim 1, wherein the deposition is carried out at 0 to 200 °C.
7. The process of Claim 1, wherein the reducing agent is silane or diethylsilane.
8. A 1,3-diimine copper complex, (I),



(I)

wherein

L is an olefin comprising 2 – 15 carbons;

R<sup>1</sup> and R<sup>4</sup> are independently selected from the group consisting of hydrogen, methyl, ethyl, propyl, isopropyl, isobutyl, and neopentyl;

R<sup>2</sup> and R<sup>3</sup> are independently selected from the group consisting of phenyl and C<sub>1</sub>-C<sub>10</sub> alkyl groups; and

the reducing agent is selected from the group consisting of 9-BBN; diborane; boranes of the form BR<sub>x</sub>H<sub>3-x</sub>, where x = 0, 1

5 or 2, and R is independently selected from the group consisting of phenyl and C<sub>1</sub>-C<sub>10</sub> alkyl groups; dihydrobenzofuran; pyrazoline; disilane; silanes of the form SiR'<sub>y</sub>H<sub>4-y</sub>, where y = 0, 1, 2 or 3, and R' is independently selected from the group consisting of phenyl and C<sub>1</sub>-C<sub>10</sub> alkyl groups; and germanes of the form GeR''<sub>z</sub>H<sub>4-z</sub>, where z = 0, 1, 2, or 3, and R'' is independently selected from the group consisting of phenyl and C<sub>1</sub>-C<sub>10</sub> alkyl groups.

10 9. The 1,3-diimine copper complex of Claim 8, wherein

L is vinyltrimethylsilane;

R<sup>1</sup> and R<sup>4</sup> are selected from the group of hydrogen, isobutyl, and neopentyl;

R<sup>2</sup> is Me; and

R<sup>3</sup> is selected from the group consisting of Me, Et, and phenyl.

15 10. An article produced by contacting a substrate with a 1,3-diimine copper complex of Claim 8.

11. The article of Claim 10, wherein the substrate is selected from the group of copper, silicon wafers, and silicon dioxide coated with a barrier layer.

20 12. The article of Claim 11, wherein the barrier layer is selected from the group consisting of tantalum, tantalum nitride, titanium, titanium nitride, tantalum silicon nitride, titanium silicon nitride, tantalum carbon nitride, and niobium nitride.